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Review

How to Use Moulage as a Simulation Tool in Medical Education?

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ABSTRACT

The promotion of student engagement in simulation-based learning depends on authenticity, fidelity, and realism. Moulage is a simulation of illnesses or physical signs onto standardized patient or manikin via using makeup techniques or other elements acting as visual and tactile cues to promote learner engagement through more real-world experience. Therefore, moulage may be used broadly in medical education wherein its authenticity helps to improve the learning outcomes and performance of students in different medical branches such as dermatology, surgery, emergency medicine, anatomy, and forensic medicine. Nowadays, Moulage is already used in the assessment of a medical student as well as in the learning process in many medical schools. However, although the use of moulage as a creative simulation tool in medical education has a positive impact on the educational process, it faces many obstacles and challenges at the same time along with its tangible benefits. Therefore, moulage is not magic as well as it is not fantasy or mock, but it is a fantastic vehicle for representing and simulating the real event promoting realism and motivating students' engagement and immersion.

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1. INTRODUCTION

The use of simulation-based learning in medical education gives the chance for medical students to get real-world experience. So, the degree of simulation fidelity depends on the status of the simulation realism [1]. Therefore, we can assess the fidelity of simulation by measuring the face validity and content validity wherein the face validity means how the simulation is realistic while the content

validity denotes to the appropriateness of the simulation for the learning objectives [2].

Noteworthy, the promotion of trainee or student engagement in simulation depends on authenticity, fidelity, and realism as well as visual cues such as moulage. So, the use of moulage is considered one of the used methods that enhance the simulation fidelity wherein it should be integrated into the instructional process of psychomotor skills teaching in medical education [3]. In this context, moulage is considered a form of art that is used as a simulation tool to add reality to the environment via

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allowing the medical student to imagine a true representation of medical condition or an injury [4].

Linguistically, moulage is considered a French word that means molding or casting. Professionally and scientifically, it is a simulation of illnesses or medical condition or physical signs such as jaundice or sepsis appearance onto standardized patient or manikin via using makeup techniques or other elements acting as visual and tactile cues or applying special effects such as painting bruises, or casting and molding wounds to promote learner engagement through a more real-world experience [5].

In addition, moulage may be used broadly in medical education wherein its authenticity helps to improve the learning outcomes and performance of students in different medical branches such as dermatology, surgery, emergency medicine, anatomy, and forensic medicine. The used types of moulage in health care simulations include many varieties such as cosmetics, body art, odors, wigs, rashes, besides wounds to engage all the senses allowing the learner to support critical thinking [6]. Moreover, there are many moulage recipes that help in simulation such as these which simulate body fluids or secretions and may use in multiple scenarios during teaching or assessment in the medical curriculum such as blood, diarrhea, urine, nasal discharge and vomiting besides other medical signs such as edema and emphysema [7].

However, although the use of moulage as a simulation tool in medical education has many educational benefits, it faces also many obstacles and challenges. It is considered a highly valuable educational tool wherein it provides an opportunity for the learners and educators to discuss the clinical reasoning leading to more learner benefits such as increasing the self-confidence and knowledge level besides enhancing permanent learning. On the other hand, there are many factors that restrict its use such as cost, supplies, manpower (personnel and time), and storage [8].

Finally, the quality assurance of moulage depends on the allowed time of application and the degree or level of qualification including the training and experience of technicians who make the moulage. Therefore, creating successful and efficient moulage is considered a difficult and daunting assignment [9].

2. HOW TO USE MOULAGE AS A TEACHING METHOD IN MEDICAL EDUCATION?

It is known that moulage is an amazing vehicle for creating a clinical real situation (simulated event) wherein the student can react and take action, and then his performance is assessed for appropriateness and if remediation is needed to get better performance after mistakes correction [10].

At first, the use of moulage in medical teaching should be within creating a scenario based on intended learning outcomes of the topic and educational unit or module. Secondly, it should determine if the use of moulage on a manikin or standardized patient. Noteworthy, there is a possibility of allergy from the used materials for the

standardized patients, so it should take care before the starting point via using some barriers and after the endpoint via immediately cleaning to get rid of it. Moreover, the use of manikin needs also using a barrier to prevent its damage for keeping on the available used facilities. Thirdly, the identification of available resources and materials via making a list of the needs according to the requirements of the scenario [11].

Furthermore, the needed resources are not only makeup materials but also includes personnel who should be creative technicians wherein they should have a skillful hand and artistic vision to create an image similar to the real case via using the available materials (Figure 1). Making of moulage needs also providing a suitable budget because moulage is an expensive tool. Nowadays, there are many bags or cases in the market that are produced by different companies and contain moulage kits and other supplies. Noteworthy, the used materials in moulage may be varied such as petroleum jelly, latex, wax, tissue paper, eye shadow, and charcoal powder along with some common household materials such as food coloring. Moreover and in developing manner, constructing prosthetics may also be used as an alternative method for making a moulage instead of using the previously mentioned materials [12].



Figure 1: Photographs showing different types of moulage on standardized patients.

However, the success of moulage use in teaching depends to a greater extent on the nature and type of medical branch that uses moulage as an instructional tool in teaching wherein it is considered an excellent simulation tool for representing specific subjects in some medical branches. For example, in forensic medicine, we can use moulage to simulate some topics such as head and neck injuries different types of wounds, and firearm injuries besides some postmortem changes. Moreover, we can also use

moulage to simulate different types of skin diseases besides its use in surgical topics such as ischemia, gangrene, fracture, amputation, different degrees of burns, different types of ulcers and injuries. In addition, moulage can play an important role in nursing education to demonstrate some nursing skills such as the first aid of emergency cases. However, it was noted that the use of moulage is not limited to drawings, figures, and pictures only but it is also used to create a clinical experience of some medical conditions such as hypoglycemic cases and hypovolemic shock [13].

3. HOW TO USE MOULAGE AS AN ASSESSMENT TOOL IN MEDICAL EDUCATION?

Moulage may be used as a simulation tool in students' assessment wherein the assessment of medical student competence should be achieved in a similar authentic situation that was used in the learning process. Therefore, the use of simulation in the assessment of medical students is considered one of the methods that increase the authenticity of the assessment method. Noteworthy, authenticity is an essential and contributing factor for the validity that depends on other factors such as the blueprinting, the scoring system and the used criteria of the examination [14].

The objective structured clinical examination (OSCE) is a common assessment method in medical education in last year's wherein it uses simulation in medical students' assessment to evaluate shows how level and knows level according to the Miller medical competence model. The objective structured clinical examination (OSCE) is objective because the students are assessed via using the same stations and the same assessment checklist while it is structured because it provides the designed specific tasks for all students covering all curriculums with specific instructions. It is clinical and theoretical knowledge application wherein the theoretical knowledge is required with the standardized questions [15].

In addition, the objective structured clinical examination (OSCE) consists of a broad spectrum of clinical tests such as the standardized patient or the real patient examination, the use of manikins, a review of radiographs, and multiple-choice written questions. In this context, moulage may be used in dynamic stations of OSCE such as a simulation of a medical condition on the standardized patient (hypoglycemic condition or traumatic case); it may also be used in static stations as a substitute for a slideshow such as simulation of wounds, ulcers or skin lesions on manikins (Figure 2) [16].

Worthwhile, some literature was published in the last years to indicate and confirm the successful use of the moulage technique in the medical students' assessment. Thus, the use of moulage in OSCE as a simulation tool was documented and approved in some medical schools and

supported by the best evidence medical education wherein it can increase the realism of the exam [17].



Figure 2: Photographs showing different types of moulage on manikins.

4. IS MOULAGE MAGIC OR FANTASY?

Finally, there is an urgent question that has become abundant in many of the recently published research and needs a clear answer, Is Moulage magic or fantasy? In the fact, the answer to this question is summarized in concise words that moulage is considered a really wonderful tool when it is used by a qualified and skillful person through sound recruitment in medical education leading to excellent results serving the instruction and assessment process. So, moulage is not magic but it is an expressive art as well as it is not fantasy or mock because it is a fantastic vehicle for representing and simulating the real event promoting realism and motivating students engagement and immersion.

5. CONCLUSIONS

Moulage is a simulation of illnesses or physical signs onto standardized patient or manikin via using makeup techniques. Moulage is a fantastic vehicle for representing and simulating the real event promoting realism and motivating students' engagement and immersion. Moulage is used as learning as well as an assessment tool in many medical schools. However, its use faces many obstacles and challenges although its positive impact on the learning outcomes and performance of students.

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